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The Energy Crisis and Sustainable Electricity: An Analysis of SADC's role in the promotion of Climate Justice in the Regions' Electricity Industry

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The Energy Crisis and Sustainable Electricity: An Analysis of SADC's role in the promotion of Climate Justice in the Regions' Electricity Industry.

by

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Dedication

First and foremost, I am thankful to my God- who has brought me through tides and pains to this point. I am grateful.

To my Parents,

For hearing me always, for carrying me when I was tired, for encouraging me when I was low, and for showing me that the world has not ended;

To my Mother,

who fights for me when I despair and celebrates every single success, no matter how small or great. Who is my sun;

To my Father,

who patiently listens to every idea and theory and is enthusiastically and readily my sounding board. Always making me better;

To my siblings,

who cheer me on in all I do and tip toe around me when I work and need it;

I have no words. I am humbled by it all, definitely not worthy of it but oh so very thankful to you, always.

ABSTRACT

Long having depended on fossil fuels to sustain its socio-economic aims, in the face of rolling blackouts and the emerging renewable energy mix the SADC region is under pressure to implement sustainable practises to meet electricity demands and ensure energy security. All in the hopes of attaining regional climate justice. This report aims to access the regions renewable energy and low carbon emitting alternative options as supported by SADC policy in order to understand how far these policies and potential can address the regions prevalent energy crisis. In so doing ,it outlines what an energy crisis is in the SADC context in order to more thoroughly evaluate SADC policies and projects implemented to meet this crisis. Having accessed the successes and failures of these, it endeavours to suggest possible ways forward in the context of the regions renewable energy potential. This report speaks to the role political will and overt nationalism have played in the regions failed energy policies, how current regional implementation is moving at too slow a pace to match socio-economic development and is thereby worsening the electricity crisis, that diversification of the renewable energy mix has been neglected and the fact that climate change must play a greater role in developing energy policies than it is currently, if climate justice is to be seriously attained. The impact of climate change on the region and its energy options is too great a factor to ignore and is used to back the use of regional SPV over the short-sightedness of hydro.

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1. Introduction and Research Overview

That Southern Africa has been plagued by energy shortages since the turn of the century is undisputed. This energy crisis has not only haunted, but also severely slowed the socio-economic advancements and environmental aims of the Southern African Development Community (SADC). Sustainability of the regions electricity industry is a concern, especially in the context of prevalent climate change impacts in the region. Particularly, in light of the fact that as climate change impacts worsen, SADC also has a role to play in mitigating GHG-emission. A role which limits its energy source options to those that are sustainable i.e., renewable energy. SADC ,formed in 1992, has made efforts to rectifying the energy crisis through sustainable electricity. In so doing, regional integration has become critical -an opinion expressed by the body and agreed with in this paper.

This report is concerned with SADC's role in the region's electricity sector. It analyses and evaluates the SADC legislative framework and application in order to highlight its successes and failures. This is done in the context of climate justice. A key understanding as discussed in this report is that the cornerstone of energy security ,in this climate change conscious green age, is sustainable electricity . To thoroughly outline SADC's role in the electricity sector, this report begins by outlining the energy crisis in the context of the region's electricity sector before turning to the SADC's energy and climate change objectives. Thereafter, the region's renewable and low-carbon emitting alternative (LCEA) potential is addressed before the application of regional policies is evaluated. From then on, the report addresses the region's practical RE and LCEA potential, feasibility and the SADC's role in the criticisms levelled against these practicalities. In conclusion, the report will briefly summarise the body's challenges as discussed with a view to recommend reforms going forward.

1. The SADC's Electricity Sector and its Energy Crisis

2.1 SADC: Context and Regional Integration

Established by the Treaty of the Southern African Development Community, 1992[1], the SADC body is composed of 16 member states as outlined in its treaty, namely: the republics of Angola, Botswana, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Tanzania, Zambia and Zimbabwe in addition to the Democratic Republic of Congo (DRC) and the Kingdoms of Lesotho and Swaziland. The number of SADC states was then brought up to 16 when Comoros joined in 2018.

Reasoning for the shift from the Southern African Development Coordination Conference (SADCC) to SADC plays a central role in criticism of the SADC's current policies. Pre-1992, the SADCC was a lax co-operation premised on the notion of backing and encouraging regional projects and programmes.[2] The need for a more effective organisation with established legal status and powers was expressed in the late 1980's, especially in light of hopes that Namibia and South Africa were moving towards democracy. SADC was planned for with the hope that it would show the regions turn away from simple cooperation between members and towards ambitious agendas for regional integration.[3] With this hope, the SADC treaty and declaration were formulated and signed in Windhoek, Namibia in 1992. This ambitious stance forms part of the basis of this papers criticisms and fuels the undercurrent debate in this report. It raises the question: with this formal legislative shift to a regional integration agenda- did the SADC actually stop engaging in mere cooperation?

The prevalence of bilateral agreements contrasted against actual regional integration arguably forms too great a portion of the SADC's approach to sustainability and energy security. However, this commentary is made in later sections. The economic-development status of this region is defined by the World Bank as a combination of 'upper-middle-income economies' (South Africa), 'lower-middle-income economies' (Comoros) and 'low-income-economies'

[1] The SADC treaty (entered into force 1992), preamble.
[2] http://www.jstor.com/stable/resrep07749.5 (SADC: Which Way SADC)
[3] Ibid.

(Malawi). The overall region is classified as a developing sub-region in which these economic differences greatly impact regional approaches to pressing matters like electricity[4]. Legislatively, the SADC treaty is the SADC's constitutional document and is thereby the basis of all SADC instruments.[5] Formed from this are SADC protocols, created to carry out the Treaty's aims and thereby have the same legal force as the Treaty,[6] as established in Article 22 which highlights that protocols are binding on all members who are party.[7] Other legal instruments used are legally non-binding documents like memoranda's, charters and pacts.[8]

The SADC treaty is rooted in hopes of a better future for the region, one that ensures socio-economic wellbeing, security and peace, in light of the regions shared colonial history.[9] That the alleviation of an energy crisis plays a critical role in the promotion of the regions socio-economic aims, wellbeing and industry growth is a factor to be discussed.[10] Regarding electricity, the SADC treaty stresses that co-operation among members is necessary in regards to social and human development, special programs, services, industry, natural resources and the environment. All of which apply to the regions electricity sector and its growth, though not expressly outlined.[11] Ruppel defines regional integration as 'the process through which neighbouring nations agree to overcome dividing socio-political, economic and physical hinderances and come together to collaborate in the managing and using of shared resources'.[12]

This is evidenced by the agreement the SADC treaty represents and the objectives it contains- all agreed to by members.[13] Of the Treaty objectives, two are most critical to this report namely that first; SADC undertakes to promote 'sustainable and socio- economic growth and development…' that will see to the eradication of poverty and enhancing of the regions quality

[4] M Barnard 'SADC's response to Climate Change- the Role of Harmonised Law and Policy on Mitigation in the Energy Sector' (2014) 1 *Journal of Energy in Southern Africa* 26, 27.
[5] O. C Ruppel & K Ruppel-Schlichting 'Climate Change, Human Security and Regional Integration: The example of the Southern African Development Community' in O.C Ruppel, C Roschmann & K Ruppel-Schlichting (eds) *Climate Change: International Law and Global Governance* (2013) 505, 519- 520.
[6] Ibid.
[7] The SADC treaty.
[8] Ruppel & Ruppel-Schlichting (Note 5 above).
[9] Note 1 above.
[10] A. S Jadhav, D.K Chembe, J.M Strauss & J. L Van Niekerk 'Status of Solar Technology Implementation in the Southern African Developing Community (SADC) Region' (2017) 73 *Renewable and Sustainable Energy Reviews* 622, 622.
[11] Note 1 above, Article 21.
[12] Ruppel & Ruppel-Schlichting (note 5 above) 514.
[13] Ibid.

of life.[14] Secondly; that SADC undertakes to ensure the sustainable use of natural resources and thorough protection of the environment.[15] To ensure achievement of these objectives- SADC undertakes to harmonise the socio-political and economic policies of the members as well as create any necessary mechanisms needed for the mobilisation of resources needed for the implementation of programmes.[16]

In light of these critical objectives, the prevalence of the sustainable development principle within the SADC founding document and any protocols speaking to energy- is apparent. It is therefore worth expounding upon in the discussions on energy and climate change legal frameworks to come. That regional economic blocs allow for the creation of frameworks that enable larger secure energy markets through energy pooling across states lines is a factor the SADC has continuously pushed for. Therefore, due to its ability to enable economic stability and growth- energy security must be discussed.[17]

2.2 The SADC's Energy Crisis and Energy Security

Energy security is best defined as the inter-dependent and concurrent existence of three elements: the availability, affordability and efficiency of electricity. The imbalance of these is how an energy crisis is created i.e. the inverse of energy security.[18] This crisis exhibits itself in the fact that of the top 30 countries with the lowest rates of modern energy, 23 are on the African continent.[19] Energy security was a necessitating factor in the formation of the SADC in 1980 and it is noteworthy that it remains a critical issue today.[20] The region's energy crisis is therefore understood as the unavailability and lack of efficient access to electricity in addition to a lack of affordable electricity where present.

[14] Note 1 above, Article 5 (1)(a).
[15] Note 1 above, Article 5 (1)(g).
[16] Note 1 above, Article 5 (2)(a) & (c).
[17] M Chanakira ' SADC Regional Economic Integration in the Energy Industry' (2011) 4 *Dounia, revue d'intelligence strategique et des relations internationals* 64, 64.
[18] N Green, B.K Sovacool & K Hancock 'Grand Designs: Assessing the African Energy Security Implications of the Grand Inga Dam' (2015) 1 *African Studies Review* 133, 139-41.
[19] Ibid, 139.
[20] Jadhav et al. (note 10 above) 622.

Electricity production in the region is failing to support household and industry growth, resulting in rolling blackouts further damaging regional commerce. In 2011, SADC noted that the region was (and would continue) undergoing an economic growth burst but that investment in electricity infrastructure to match this growth was lacking.[21] Factors like poor facility maintenance, bad project planning and worsening climate change impacts have also contributed towards the crisis.[22](With SADC forming a substantial portion of Sub-Saharan Africa (SSA)) Energy poverty in SSA is so great that in 2019, 600 million people did not have access to electricity.[23] Where access is bettering, the rate is so slow it struggles to keep pace with economic developments and urbanisation.[24] Except for Mauritius and Seychelles, 2019 showed that all member states had low electrification levels with rural areas carrying the brunt.[25]

While fossil fuels have historically played a prominent role in forming global economies, as the world moves to embrace renewables, guaranteeing energy security in SADC has become imperative.[26] Energy security impacts all facets of socio-economic and environmental regional development. As the energy crisis rages, the upholding of sustainable development within the electricity sector is compromised.[27] The regions energy deficit being worsened by its economic growth rate was estimated at 5% in 2011. However, because of the causation-based relationship between a nations GDP and its energy availability it was estimated that few countries within the region could expect to grow above 5% post-2011.[28] Contrastingly, energy demands are projected to steadily increase over the next three decades.[29]

[21] M Carson, T Gill, O Johnson & K.L Rosner 'Rethinking Southern Africa's Energy Crisis' (2018) 1 *Stockholm Environment Institute* 1, 1.
[22] Carson et al. (note 21 above).
[23] H Tazvinga, O Dzobo & M Mapako 'Towards Sustainable Energy System Options for Improving Energy Access in Southern Africa' (2020) 2 *Journal of Energy in Southern Africa* 1, 4 & 12.
[24] Ibid.
[25] Ibid.
[26] A.E Okem 'Global Energy Demand and its Implications for Sub-Saharan Africa' in L.E. Asuelime & A.E Okem (eds) *The Political Economy of Energy in Sub-Saharan Africa* (2017) 71, 72-4.
[27] Okem (note 26 above).
[28] Z.N Jobodwana 'Political and Economic Integration in the SADC: Reforming the Energy Sector Regulatory System' (2014) 1 *Journal of Law, Society and Development* 7, 8-9.
[29] Okem (note 26 above).

In 2018, out of a regional population of 177 million people only 43% had access to electricity.[30] Electricity access hinges on the green-diversification of the electricity mix, in order to ensure the reliability of an uninterrupted, sustainable and sufficient electricity supply. This ,in turn, would insure that energy security is obtained as defined above. The Intersection between climate injustice and energy poverty is found in these statistics. Energy poverty substantially affects vulnerable groups more in numerous socio-economic manners. In particular women, the extremely poor and the disabled .[31] Rolling black-outs have been a regional terror since the 1990's, and it is this crisis that has encouraged member states to hasten implementation of diverse and sustainable resources into the regions electricity sector.

2.3 The SADC's Electricity Sector

Understanding the crisis as outlined above it is clear that the region's electricity sector contends with a pressing challenge. One of trying to guide the energy industry in a manner allowing for the attainment of sustainable, available and adequate access to electricity that still allows the region to develop socio-economically while being GHG-emission conscious.[32] The electricity issues plaguing the region are best categorised into two main issues; first, a lack of access to electricity estimated at 48% regionally with 75% exhibiting itself in urban settings. Then energy security concerns due to the region's over-dependence on fossil fuels or any other one source in their country's energy mixes (where energy security is used in a wider sense within this report).[33] In 2015, the International Renewable Energy Agency outlined that energy demand in the region could be expected to grow from 280 TWh in 2010 to 570TWh by 2030. The take-away being that where the crisis is unrectified, the region can expect energy demand to continue to outstrip production and industry growth.[34]

[30] D Hadebe, A Hansa, C Ndlhovu & M Kibido 'Scaling Up Renewables Through Regional Planning and Coordination of Power Systems in Africa- Regional Power System Planning to Harness Renewable Resources and Diversify Generation Portfolios in Southern Africa' 5 *Renewable Energy Reports* 224, 224.
[31] Ibid.
[32] K.C Bowa, M Mwanza, M Sumbwanyambe, K Ulgen & J Pretorius 'Assessment of Electricity Industries in the SADC Region, Energy Diversification and Sustainability' (2021) 2 *Advances in Science, Technology and Engineering Systems Journal* 894, 895-99.
[33] Ibid.
[34] Ibid.

The electricity sector is currently dominated by coal (75% of the energy mix) and hydropower (20.1%) ,whose potential has been estimated as being around 1 080TWh per year yet, as of 2021, 31 TWh/per year has been utilised.[35] The prominence of hydroelectricity in the region is due in large part to the power of the Congo river in the DRC and the Kariba Dam on the Zambezi river between Zimbabwe and Zambia.[36] Large reserves of cheap coal have also been abundant in much of lower SADC, namely; Zimbabwe, Botswana, Mozambique and South Africa. Furthermore Tanzania, Mozambique and Namibia have put in national efforts to develop natural gas fields offshore- efforts which would see the regions energy mix marginally diversified.[37] Nuclear makes up 4% of the energy mix (only used in South Africa) and diesel contributes 1.6%.[38] The building and utilising of medium and large scale Solar and Wind projects are being slowly undertaken, if at all in member states and so any regional contribution to the energy mix is miniscule.[39] Regional use of biomass is prominent, especial in rural settings and has greatly contributed to deforestation due to dependence on it to fuel homes.[40]

That the coal industry plays so great a role in regional electricity generation is thanks in large part to the dominant role played by South Africa in the regions energy supply as the country holds much of the regions coal. An important player in the regions electricity sector is the Southern African Power Pool (SAPP). Established in 1995 as a SADC regional body- the SAPP members created a regional power grid with the intention that it would enable easier electricity trade as well as lower energy costs.[41] Based on long-term bilateral contracts between members, these agreements are aligned and comply with SADC treaty guidelines.[42] The Power Pool's aim is to strengthen energy support and sharing between members with regards to energy resources and during emergencies or peak periods.[43] Presently, all SADC members except for Madagascar, Mauritius and Seychelles are SAPP members, with membership being

[35] B Schreiner & H Baleta 'Broadening the Lens: A Regional Perspective on Water, Food and Energy Integration in SADC' (2015) 5 *Aquatic Procedia* 90, 94-7.
[36] Southern African Research and Documentation Centre (SARDC) 'Overview of the SADC Energy and Resources Prospects and Challenges for China-SADC Cooperation' (September 2017), 6-7.
[37] Ibid.
[38] The SADC Infrastructure Master Plan: Energy Sector Plan (August 2012) (SADC Secretariat), 2.1.1.
[39] The SADC Infrastructure Plan (note 38 above).
[40] Barnard (note 4 above) 27-8.
[41] B.D Botterill 'South Africa's Electricity Crisis: The Need to Reconcile Environmental Policy Decisions with International Treaties' (2012-2013) 4 *San Diego Journal of Climate Change and Energy Law* 225, 230.
[42] Ibid.
[43] Jadhav et al. (note 10 above) 622.

represented by power utilities from all 12 nations.[44] The SAPP coordinates the planning and operation of regional electric power systems and provides a forum for member states to collectively tackle regional electricity issues, including the current energy crises.[45] This very regional body noted and announced, as early as 1999, that the region would soon exhaust all surplus capacity.[46]

In what this paper will highlight as a common theme, while the problem was effectively identified- members failed to put mitigation plans into action.[47] This has left the region in a lurch, as efforts addressing the crisis only begun once it had hit. This brings into the question the extent of the SAPP and SADC's powers regarding energy emergencies as well as the member states genuine grasping of the gravitas of the crisis. This aside, the SAPP has expressed understanding of the fact that power resources within the region are unevenly distributed with the Inga reservoir and the Cahora- Bassa further north in Mozambique. While the DRC, the Kariba Dam and Coal are further south.[48] The SAPP, outside of its legal limitations, has faced many challenges in its efforts to develop the regional grid more. Namely limited transmission capacity and nationalism to the detriment of regional integration.[49] As of 2018, power infrastructure was still lacking with Angola, Malawi and Tanzania still not connected and thereby limiting the SAPP trading platform.[50]

[44] Ibid.
[45] http://www.sapp.co.zw/about-sapp
[46] Jobodwana (note 28 above) 28.
[47] Ibid.
[48] K Uprety 'Transboundary Energy Security: Emerging Legal and Institutional Framework for Electricity Trading in Southern Africa' (2002) 20 *Journal of Energy and Natural Resources Law* 379, 379-80.
[49] Ibid.
[50] SADC & SARDC *SADC Energy Monitor 2018: Enabling Industrialisation and Regional Integration in SADC* (2018) 3 & 14-6.

3 SADC and Energy, Climate Change, Potential and… Implementation?

Understanding SADC's electricity sector and the crisis it faces-as outlined above- this section aims to delve deeper into its energy provisions. Undertaking this section requires a brief detour into discussing the role of sustainable development in climate justice and SADC's policy making and the ways in which it can and cannot be seen in SADC's energy and climate change approach. Thereafter, the regions sustainable energy options will be accessed- especially as this paper seeks to discuss them theoretically and practically. With a greater understanding of SADC's policies and the regions renewable/LCEA options, this section will spend much time deliberating and critiquing SADC's policy implementation against the backdrop of four projects it has highlighted as critical to the regions energy future.

3.1 SADC: The Energy and Climate Change Nexus

3.1.1 Climate Change and Sustainable Development

The relationship between climate change, sustainable development and climate in/justice is critical in the discussion of SADC's legal framework as it applies to a socio-economically steeped concern like electricity. Regionally, climate injustice speaks to the role SADC did not play in the environmental harm it must now play a role in mitigating for fear of being left behind.[51]Ozone-harm is the result of centuries of global north nations plundering the environment in order to advance - to the detriment of the global south.[52] This is highlighted by the fact that in 2000 Africa had only contributed 3.6% of global GHG-emissions. Climate harm having reached this defining point ensures that despise having insignificantly contributed, SADC must now minimise and cease use of fossil fuels previously used by now 'developed nations' to advance.[53]The result: slowing of the region's economic growth while it attempts predominant use of the renewable sources discussed in this paper. This is the very definition of climate injustice, that as the global north can continue to advance on the foundation it created

[51] M Kidd *Environmental Law* (2011) 297.
[52] W Scholtz 'The Promotion of Regional Environmental Security and Africa's Common Position on Climate Change' (2010) 1 *African Human Rights Law Journal* 1, 2-3.
[53] Ibid.

through use of fossil fuels- the global south now must move at a much slower pace. Without the assistance of the same fuels. All in order to assist in the mitigating of a disaster created by the former nations. A disaster which poses a greater threat for the global south than anyone else due to the region's specific vulnerabilities to climate change. So, while unjust this cannot limit the renewable energy role SADC must now play.[54]

Climate injustice further shows itself in the fact that food and water insecurities brought about by climate change hit hardest in historically colonised regions like SADC that are plagued by pressing socio-political concerns. Namely poverty, political instability and limited access to resources.[55] It also exhibits itself in the unfair distribution of the negative impacts of plundering.[56] Thus, that the most vulnerable in society (SADC) are most impacted by climate change effects on energy and economic development speaks to the importance of sustainable development in addressing this.[57] The two SADC treaty objectives outlined above highlight that SADC instruments are rooted in this principle. Sustainable development is the balancing of social, economic and environmental considerations in all decision-making processes. This is evidenced by the SADC protocols emphasis on the promotion of sustainable socio-economic development that ensures the alleviation of poverty as well as the sustainable use of the environment.[58] Sustainable development expresses concern for future generations and ways in which fossil fuels will deprive them of a socio-environmentally sustainable planet.[59]

The SADC energy framework is geared towards ensuring that future generations are not forced to grapple with the same crisis.[60] The resultant increase in intense weather extremes brought by climate change has been reported by the Intergovernmental Panel as having contributed to the reduction of water security and impeding of sustainable development efforts.[61] The region will experience increased heat/droughts between 2021 and 2040 which will increase human mortality.[62] The implications on water dependant electricity will be further discussed under

[54] Sixth Assessment Report of the Intergovernmental Panel on Climate Change (Working Group II ,March 2022), 10-19
[55] Ibid.
[56] D During 'Climate Change and Human Mobility 'in in T Humby, L Kotze, O Rumble & A Gilder (1 ed) *Climate Change: Law and Governance in South Africa* (2016) 21-2.
[57] Kidd (note 51 above) 301.
[58] J Glazewski *Environmental Law in South Africa* (2013) 1.1, 1.4.2.
[59] Glazewski (note 58 above).
[60] Ibid.
[61] Note 54 above.
[62] Ibid.

heading 3.3. Balancing these sustainable development considerations is critical in the regions fight against these impacts, as the environmental consideration has not always carried enough weight. These considerations would contribute towards climate justice attainment through the creation of policies and projects which ensure the alleviation of not only present day uneven and unfair environmental impacts of the global norths actions regionally- but also for the future.

While socio-economic considerations are critical given the regions unique burdens, because it is one of the most vulnerable it has the most to lose should it not effectively incorporate sustainability into development. Understanding the relationship between climate injustice post-colonialism and sustainable development within the context of climate change and its impact on water and energy- it is concerning that as of 2021 SADC still does not have a climate policy. It depends on its mentioning in other protocols or non-binding documents, thereby ensuring the injustice continues.[63]

3.1.2 SADC Energy Framework

The SADC treaty objectives Art. 5(1)(a) and (g), as outlined under heading 2.1. form the basis of the SADC's policy approaches to climate and energy. While climate change does not have its own protocol, several others speak to it including the SADC treaty itself and, most importantly, the SADC Protocol on Energy of 1996.[64] This, as will be highlighted, is important as the impact of climate change on the regions energy options must play a greater role in the policy decisions made regarding the use of specific energy sources. SADC's vulnerability to climate change must inform its ability to mitigate and adapt. Especially given the socio-economic concerns of these nations and how the crisis has only worsened them.[65]

Regional approaches to renewable energy are rooted in the Energy Protocol which has as an objective the intention to harmonise regional and national energy policies on common interest matters among members based on equity and balance.[66] As well as another objective outlining

[63] W Scholtz & D.M Pallangyo 'Climate Change and the African Union' in in T Humby, L Kotze, O Rumble & A Gilder (1 ed) *Climate Change: Law and Governance in South Africa* (2016) 14-5.
[64] The Protocol on Energy (entered into force 17 April 1998).
[65] During (note 56 above) 21-5.
[66] The Energy Protocol, Art. 3 (1).

its aim to cooperate in the development and use of energy stemming from numerous sources, including renewable energy.[67] This is the only protocol provision to address renewable energy. While not mentioning climate change, the protocol does undertake to ensure that any use of energy is sustainable and environmentally-sound. It establishes an Energy Commission imbued with legal personality and tasked with carrying out implementation of the Protocol, which includes the development of research, funding and coordinating of regional energy projects.[68] Noteworthy is Article 7 which states that energy-development is a matter unconstrained by borders. Therefore, cooperation between members and non-members/organisations is encouraged so long as SADC member obligations are not abandoned.[69]

Though small, and mentioning renewable energy once, the protocol does create a framework for the cooperation of members in the development of energy infrastructure and enables the formation of greater energy markets.[70] The aim being to use regional energy integration as a means through which to address the uneven regional distribution of energy sources. As well as to maximise energy interrelationships already in existence, create low-cost solutions to the crisis and support for large hydro-projects.[71] The significance of hydroelectricity as it relates to future renewable endeavours is so prominent that the SADC Protocol on Shared Watercourses[72] bears mentioning. Particularly, that as a protocol dedicated to fostering closer cooperation regarding the sustainable co-management and protection of watercourses shared by members -it formed the basis of the climate change strategy for the water sector.[73] This strategy undertook to improve the regions climate resilience through bettering adaptation, development and management of regional water resources.[74] It recognises that climate change impacts on water affect other sectors ,namely energy and thus stresses the need to adopt an integrated water resource management stance as harm to water resources impacts everyone.[75]

[67] The Energy Protocol, Art 3 (3).
[68] The Energy Protocol, Art 4, 9, 11.
[69] Note 64 above.
[70] Scholtz & Pallangyo (note 63 above) 19-20.
[71] Ibid.
[72] The Watercourses Protocol (entered into force 10 February 2000).
[73] Climate Change Adaptation in SADC: A Strategy for the Water Sector (2011).
[74] Ibid, 2.
[75] Scholtz & Pallangyo (note 63 above) 18. However, as this section aims to simply lay out regional legal instruments, important critique of these will be discussed under subheadings 3.3.2 and 4.

Bodies like the Intergovernmental panel on climate change highlight that as a region particularly vulnerable to climate change, SADC is likely to become drier. It is estimated that in 2020 75 to 250 million SADC residents had begun experiencing increased water scarcity, stranger rainfall patterns and increased droughts.[76] Understanding the relationship between energy (in light of the region highlighting Hydro as the 'go-to' renewable source) and climate change highlights the Energy Protocols damning lack of express mention of climate change given its gravitas. As measures addressing climate change have the potential to threaten energy security/access/affordability- addressing climate change will always be linked to energy security. An additional concern becomes the impact this link has on the just transition discourse at a regional level.

It is perhaps heartening that in 2019, the SADC energy commission noted that it had been some 21 years since the coming into force of the protocol and that there had been significant environmental advances since.[77] The Ministers approved a review of the policy in order to update it, with such review being set as a SADC energy target in the Regional Indicative Strategic Development Plan and beginning that year. [78] It can be hoped for that the review addresses the role climate change should be playing in the regions choice of renewable projects and its impact on regional energy security. The SAPP has constantly expanded upon both the SADC and Energy protocols and spoken on the cost-effectiveness of renewable energy. Especially in light of the regions continued development.

In addition to the SAPP, the Regional Electricity Regulatory Association (RERA) was established under SADC in 2002 and tasked with facilitating the harmonisation of energy policies among SADC energy regulators.[79] It serves as a platform for more substantial cooperation between regulators. However, RERA's progress in advancing the Energy Protocol's objectives in addition to its own has been slow. This is due in part to little advancement being made in the privatisation of monopolised power generation utilities as it had endeavoured.[80] Having been criticised as providing an ineffective oversight role, RERA's mandate was ,interestingly, brought under review in 2019 in the hopes of transforming it into

[76] Jobodwana (note 28 above) 10-11.
[77] https://sadc-energy.sardc.net/ETG_Bulletin/ETG_Bulletin_April_2019.pdf
[78] RISDP 2015-2020.
[79] Chanakira (note 17 above) 69-72.
[80] Ibid.

a regional regulator.[81] With this move to broaden RERA's reach being informed by the regions need to develop sustainable regional energy markets, RERA now extends beyond electricity in hopes of ensuring affordable energy services, fixing electricity infrastructure and ensuring reliability.[82]

In concluding, to be noted is the golden thread linking all energy focused protocols and frameworks discussed thus far. Namely, that all make mention of the need for genuine regional integration regarding energy- a 'call to arms' this report will explore in both commentary and criticism. The now defunct SADC tribunal once spoke not only to its critical role in ensuring actual regional integration but also to the duty placed on members to ensure that the Treaty, and accompanying protocols, is accorded the force of their national laws.[83] It further elaborated on the balance to be struck between these regional protocols and domestic laws. Namely that neither legal system should be considered as above the other and rather both were to be viewed as holding 'sway' respectively.[84] While discussions of a regional just transition and its rate could have been further discussed, especially in light of the guidance the Tribunal could have played in this necessary discourse, the topic is outside this studies confines.

3.2 SADC's RE/LCEA Potential… Theoretically

While not exhaustive, the above mentioned protocols and regional bodies make up the more critical aspects of the regions legal framework. While the report will mention other SADC energy relevant frameworks it bears noting that there are a significant number of these, none of which are binding. That these are so many, yet it has been 24 years of a somewhat hollow Energy Protocol should be viewed as being indicative of a lack of policy development in the regions energy aims. Such development would be seen in the constant updating of energy binding-laws. Binding because the role climate change should play in regional renewable energy developments is severely undercut.

[81] Note 73 above.
[82] Ibid.
[83] *Government of the Republic of Zimbabwe v Fick and Others* 2013 (10) BCLR 1103 (CC).
[84] *Gramara (Private) Ltd & Another v Government of the Republic of Zimbabwe & Others* [2010] JOL 25340 (ZH).

The region holds an abundance of renewable energy and LCEA resources. This report will speak in particular to hydro, solar, wind and uranium. Many of these remain underexploited, resulting in the region being one of the lowest consumers of energy globally.[85] This subheading aims to discuss this potential as well as current renewable energy use before discussing practicalities and criticisms under heading four. Renewable energy is a part of the regions energy mix. Though coal-generated electricity remains a large portion of it, the regions use of biomass and hydropower does substantially contribute to the SAPP.[86] SADC has outlined hopes that through regional integration through the SAPP and RERA, renewable energy's portion in the grid will have increased to 37% by 2027 and a 100% by 2050.[87]

Biomass accounts for 36% of the regions energy mix, hydro contributes 1.95% and other Renewable sources contribute less than a 1%.[88] Nuclear, as a LCEA, accounts for 1.6 % of the regions energy mix due in large part to its use in South Africa only.[89] Though, Namibia also holds great uranium deposits while Botswana and Zimbabwe remain in the exploration phase.[90] Regionally, uranium has predominantly been viewed through a commercial lens as a mineral to export and not as the affordable and low-carbon contribution it would make to the electricity sector.[91]The great potential of uranium, especially when plugged into an SAPP that functions as intended (as a regional power pool and not dependent on bilateral agreements) is yet unrealised. Its use would ensure that emissions released would be a fraction of fossil fuel emissions. Presently, regional electrical use of nuclear has no concrete plans and is faced with NGO oppositions. This is presently happening in South Africa where a series of cases have been brought to the courts by Earthlife Africa between 2005 and 2017. This being an NGO of environmental activists who have been the face of national nuclear-backlash amid fears of the threat nuclear could pose to the country's environmental rights.[92]

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[85] V.H Van Zyl-Bulitta, B Amigun & A.C Brent ' Towards a Southern Africa Development Community (SADC) model to assess financing options of Renewable Technologies' (2009) 2 *Energy and Sustainability* 91, 92.

[86] https://www.sadc.int/themes/infrastructure/en/hydropower/

[87] Ibid.

[88] The SADC Infrastructure Plan (note 38 above) 2.1.4.

[89] Ibid, 2.1.5.

[90] SARDC (note 36 above) 7-17.

[91] K. Valichkov 'Synchronising Nuclear Governance in SADC Member States through Regional Cooperation' (2021) 332 *Southern African Institute of International Affairs* 2, 4-5.

[92] *Earthlife Africa (Cape Town) v Director-General: Department of Environmental Affairs and Tourism* 2005 (3) SA 156 (C).

The SADC 2018 Energy Monitor notes that solar radiation is abundant with the region clocking in 2500 hours of sun per year ,essentially 20 000 TWh, yet only Namibia and South Africa produce on-grid power.[93] SADC also highlights that while wind generates about 800TWh with a currently installed capacity of under 1%, it is unevenly distributed regionally.[94]Wind-generation potential is generally found along the coastline with the members with substantial potential being Namibia, Angola, Tanzania, DRC, Seychelles, Madagascar, Lesotho, South Africa, Mozambique and Mauritius. Yet South Africa remains the only generator of on-grid wind on the continent.[95]It is accepted fact that the region contains substantial geothermal potential, with an estimated 4 000MW along the Tanzania, Malawi and Mozambique Rift Valley. However, there has been very little if any use of it.[96] While there is experience with regional biofuel production - energy production remains limited.[97]

Lastly, Hydropower remains the most utilized renewable source regionally due in large part to two factors: some communities have always been dependent on hydropower exclusively and secondly, it has historically provided the cheapest renewable generation.[98] SAPP stated that installed hydro capacity amounted to 13 223.5 MW in 2017 and constituted 21% of the regions electricity capacity at the time.[99] Due to the Congo river being the continent's most powerful river, the DRC holds the largest operational capacity presently at 2 442 MW. The SAPP listed the region's biggest hydro contributors in 2017 as being Angola, Mozambique, Zimbabwe, Zambia, DRC, Malawi, Tanzania and South Africa.[100] SADC has been so aware of the Renewable benefits of hydro that the SAPP has made the hydro-resources of the Zambezi River Basin (ZRB) a cornerstone in their growth plans.[101]

The ZRB's role in obtaining electricity security has been stressed by the SAPP with the importance of hydro being highlighted by the fact that all four major SADC-backed projects are hydro projects.[102] Regional integration would serve to address the uneven distribution of

[93] SADC Energy Monitor (note 50 above) 3.4.
[94] Ibid.
[95] Ibid.
[96] Ibid.
[97] Ibid.
[98]Ibid.
[99]Ibid.
[100] SADC Energy Monitor (note 50 above) 3.4.
[101] R Spalding-Fecher, B Joyce & H Winkler 'Climate Change and Hydropower in the Southern African Power Pool and Zambezi River Basin : System-wide Impacts and Policy Implication' (2017) 103 *Energy Policy* 84, 84.
[102] Ibid.

the above renewable/LCEA resources. It would ensure the efficient use of these resources in a larger and more effective energy market so as to guarantee electricity availability and affordability.[103] Most importantly, it would create a diverse energy mix which by its very nature would ensure that nothing of the extent of the current crisis would ever occur again. However, as is to be highlighted, criticism that the SADC members have not truly embraced regional integration and thereby lost out on its desperately needed benefits is valid.

3.3 SADC Generation Projects as Proof of Efficient Regional Integration and Policy Implementation?

3.3.1 The Projects

Understanding these criticisms requires a discussion of the SADC's current projects. That the SADC energy monitor and Regional Infrastructure Master Plan predominantly focuses on Hydro to the detriment of other feasible renewable options, must be noted with concern. Interestingly, the Master Plan itself notes that SADC instruments fail to cater for renewable energy outside of hydro-developments.[104]In attempting to ensure the 2050 renewable energy goal is met, the SAPP dedicated the Energy Sector Plan to highlighting four major hydropower plants as critical in aiding in meeting these objectives.[105] The projects being: the Mphanda-Nkuwa (Mozambique), the Batoka Gorge (between Zimbabwe and Zambia), the Lesotho Highlands Water Project (phase 2) and most importantly the Inga III.[106]All three (Lesotho project capacity remains unclear) are estimated to be capable of generating a total of 7 300 MW, of which Inga III would have contributed 4 200MW.[107] Other approved projects include the development of two major transmission lines with the North-South line running 8000km and the Central African inter-connector running 3800km. Both of these would not be confined to SADC and would theoretically see other regions contributing so investment costs could be

[103] Chanakira (note 17 above) 67.
[104] The SADC Infrastructure Plan (note 38 above) 1.2.1.4.
[105] Ibid.
[106] Ibid.
[107] The SADC Infrastructure Plan (note 37 above) 4.1.

lowered to $20 billion.[108] A substantial come down as SADC had estimated the final amount at $28.5 billion.

The Batoka and Mphanda-Nkuwa projects both draw from the ZRB, attesting to the critical role it plays in the regions renewable policy approach.[109] The Batoka Gorge project straddles the Zimbabwe-Zambia boarder and is expected to produce 2400 MW.[110] However, as is evidenced by the electricity capacity is holds, SADC's attentions are most focused on the Inga III project. So much so that the lion's share of research into SADC projects is on it. Therefore, hopes and valid criticisms of it will be a central aspect of this paper. The low cost of hydro, especially as a renewable source that has been used in the region for some time and is therefore not viewed as requiring research, in addition to its high load factors has spurred the SAPP's focus on its development and that of transmission infrastructure. [111]

Mphanda-Nkuwa, a decades long plan revived in 2018, will be situated on the Zambezi River some 60km away from the Cahora Bass in Mozambique.[112]In July 2021 Mozambiquean deputy justice minister, Filimao Suaze, stated that the country expected the project to be generating electricity by 2030 and would be constructed over 6 years.[113] With an expected capacity of 1500MW, most of the generated power will be sent to the country's capital. However, finding a buyer for the rest remains contentious.[114] While it had been expected that Eskom would be a buyer, due to its Cahora Bassa history, the power utility has not expressed an interest. The Batoka Gorge is the only proposed project to be constructed and spearheaded by two countries- which has resulted in several challenges.[115] Also placed on the Zambezi, it is expected to generate 2400MW, making it the third largest hydro plant on the continent.[116] While it is planned that the generated electricity will address rolling blackouts in both Zimbabwe and Zambia, an agreement to export through the SAPP has not been expressed.[117]

[108] Ibid.
[109] Ibid.
[110] SADC Energy Monitor (note 50 above) 3.4.1.
[111] Hadebe at al. (note 30 above) 226.
[112] https://allafrica.com/stories202110721063.html
[113] Ibid.
[114] Ibid.
[115] https://www.pietrangeli.com/batoka-hydropower-zambia-zimbabwe
[116] Ibid.
[117] Ibid.

The second phase of the Lesotho Highlands Water Project continues to move slowly as of June 2022. As an addition to phase I (completed in 2004) this project aims to provide water security to South Africa's Gauteng province through the construction of several dams to harness the Senqu-Orange river.[118] This would allow Lesotho to channel water towards Gauteng while also generating hydropower for itself. Lastly, is the Grand Inga project which has held the world's attentions since the 1930's due to its 42 000 m3/s flow from the Inga Falls which fuelled hopes for a megaproject.[119] Termed the 'Grand Inga', the project is a combination of two dams with plans for the third underway and hopes for several more. The first dam was constructed in 1972 and successfully provided reliable energy to the DRC's capital.[120] However, the second dam (1982) failed to replicate this success as it was built five years before the power grid it needed to supply electricity to mining in the east.[121] Sitting unused for years the dam's infrastructure became dilapidated resulting in only 20% of the Inga II's potential being used to this day.[122]

Plans for Inga III, though previously debated, were revived in 2006 under the DRC's President Kabila.[123] If completed successfully, Inga III would have a capacity twice that of China's Three Gorges Dam and almost equal to the African continents' biggest electricity supplier. It would be capable of powering a regionwide transmission network.[124] With its enormous potential as a 'mega-project', claims it could remedy the regions energy crisis are well founded. So much so that South Africa, despite the projects numerous setbacks, entered into a treaty with the DRC in March 2013 to ensure Inga III is completed.[125] Initially, the sponsoring of Inga III fell to several parties one of which was the Western Corridor Project (WESTCOR), a SADC project consisting of the SADC secretariat, Angola, Botswana, DRC, Namibia and SA. Their aim was to harness the Congo River into supplying electricity for these countries and then hopefully for the rest of SADC.[126]

[118] https://www.smec.come/what-we-do/projects/Lesotho-Highlands-Water-Project-Phase-2
[119] J Warner, S Jomantas, E Jones, S Ansari & L De Vries ' The Fantasy of the Grand Inga Hydroelectric Project on the River Congo' (2019) 11 *Water* 1, 1- 5.
[120] Ibid.
[121] Ibid.
[122] Ibid.
[123] A Maupin 'Energetic Dialogues in South Africa: The Inga Example' (2015) 16 *Policy Insights* 1, 2-8.
[124] Green et al. (note 18 above) 133-9.
[125] Ibid.
[126] Chanakira (note 17 above) 70.

However due to insufficient progress with Inga III, WESTCOR ceased investing and the DRC left WESTCOR. This would result in the bilateral DRC-RSA agreement.[127]The World Bank had also been a sponsor, initially supplying money for the rehabilitation of Inga I and II in 2004 and $73 million for socio-environmental and technical studies regarding Inga III in 2014.[128] However, due to procurement issues these studies were never done. Around the same time the USA withdrew support for the World Banks 'Inga III technical assistance package', stressing the Inga I and II delays as reasons.[129] By 2016 the rehabilitation of Inga I and II was 10 years overdue, still undone and the expected cost of rehabilitation overshot five times over. The World Bank then withdrew support. By 2019, in addition to WESTCOR and the World Bank; Posco and Daewoo had also withdrawn, leaving only two of the original 11 investors- none of them, from the SADC region.[130]

3.3.2 A Failure of Policy?

Evidentially, the road to the Inga III construction has been difficult. In 2017 two other bidders were selected and the DRC announced that construction would begin in 2019 and completed by 2025.[131] As of June 2021, construction has not begun and analysts predict that the last five stages of Grand Inga should be expected between 2030 and 2045.[132] The Inga III matter paints a daunting picture of SADC's regional cooperation efforts.[133] While the SAPP prioritised these four projects, the Inga III has highlighted the extreme presence of bilateral agreements between project-holding states and one other nation, and outside of the SAPP. While one could posit that other members could be waiting for these projects to conclude before expressing solid interest, these are still essentially sole country projects. Only benefitting those nations and one or two others and not regional projects. This is thus largely a commentary on the SAPP, RERA and SADC's implementation of its policy.

[127] Ibid.
[128] Warner (note 119 above) 6-7.
[129] Ibid.
[130] Ibid.
[131] Ibid.
[132] Ibid.
[133] Chanakira (note 17 above) 70.

Having looked at the regions projects and renewable potential, the heading 3.1. discussion regarding the impact of climate change on hydropower must be accessed. That regional drought increasing impacts of climate change will threaten all the hydro potential the SAPP has undertaken to develop should be a concern.[134] Especially in light of the fact that all projects chosen are hydropower-centric. As the region dries, damage to the energy security balance could be so great as to undo hydro project benefits and force the region back into fossil fuels.[135] Additionally, it has been found that the regions climate future will have a greater impact on the supply of water in the ZRB, the source of two priority projects and an SAPP cornerstone.[136] The Intergovernmental Panel warns that the regions climate vulnerabilities will exhibit themselves through increased heat and drought which would have implications on water security, thus delivering a heavy hit to hydro-project advantages.[137]

This throws the SADC's approach into question, because while the RIDMP is meant to serve as a framework through which member states can choose to operate- it is composed of SADC's own stance on energy and climate. It stresses that renewable sources like hydro are vulnerable to climate change and so planning should consider climate change impacts on renewables and ensure adaptation measures are employed.[138] Yet the energy commission, SAPP and RERA fail to note this very point in their hydro aims. Estimates state that the incoming dry climate typically lessens generation by a maximum of 20%. With more loss expected because of Grand Inga and higher competition created over shrinking water resources.[139] Additionally, Batoka Gorge has shown the greatest propensity for extreme climate sensitivity.[140] The IPCC has emphasised that with water security expected to come under threat in the lead up to 2040, climate resilient development is imperative.[141] Focus on water-driven sources flies in the face of this. With the IPCC outlining that climate change will regionally worsen droughts and water security, it stresses that this will threaten energy security -especially hydro.

As a region in need of energy rescue, the length of time associated with planning ,building and running a hydro-plant is concerning in light of the Inga III example. Inga III has been delayed

[134] Spalding-Fecher et al. (note 101 above) 84-9.
[135] Ibid.
[136] Ibid.
[137] Note 54 above.
[138] The SADC Infrastructure Plan (note 38 above) 2.4.7.
[139] Spalding-Fecher et al. (note 101 above) 90.
[140] Ibid.
[141] Note 54 above, 30-1.

for over eight years and has bled investors and money because of delay costs. Large hydro-projects are known to constantly face delays and therefore cost overruns. With Inga III starting to be termed a 'fantasy', the viability of all four projects -before the crisis worsens- must be questioned.[142] The RIDMP was released in 2012, outlining these projects, yet 10 years later they all remain in planning phases and due to Covid-19, the delays may continue. This report posits that the SADC has failed to create and implement instruments that take heed of current pressing concerns and have been slow in rectifying this failure despite its pressing nature. Instruments speaking of the climate threat to Hydro do so in a laissez-faire manner, not addressing the ways this must change regional renewable energy plans.

These instruments have been non-binding, punting an unimaginative push for hydro based on its historic role in the region while neglecting sources more adaptable to the impacts the region is undergoing. That regional renewable energy funding from the international community is insufficient, makes the attainment of climate justice even more difficult.[143] Its attainment relies on the assurance of no one region getting left behind as the rest of the world moves towards a low-carbon economy. Especially those regions who have historically contributed the least to this climate harm.

[142] https://www.internationalrivers.org/resources/reports-and-publications/inga-3-too-high-a-cost-for-south-africa/

[143] https://takeclimateaction.uk/resources/what-climate-justice

4. **Practicality and the way forward**

4.1 *Untapped Potential : A Practical Energy Option and Failed Implementation*

Inga III needs more regional investment than just South Africa. While policies and frameworks exist, there has not been implementation via the SAPP or SADC and so the question remains: can Inga III's great regional energy potential ever be realised in the absence of true regional integration?[144] This report ventures to say no. SADC regional energy cooperation is weak, there is great nationalistic approach to the sector that sees members focus on gaining electrical self-sufficiency to the detriment of regional cooperation.[145] This is highlighted by the four projects. Additionally, even when cooperation occurs it is not regional but is based on bi-lateral long-term agreements.[146] This short-sighted approach overlooks the energy and, therefore, economic benefits of actual regional integration. Especially as it speaks to the availability, affordability and security of electricity provided by an energy mix supplied by all.[147] The South African power outages of 2008 resulted in rolling blackouts in the SADC neighbours it shared bilateral energy agreements with (Botswana/Zimbabwe).[148]

This speaks to the pros of actual energy integration. That while power shortages in one member can impact another, where sustainable energy is present and channelled through the SAPP by all members- renewable alternatives could benefit everyone through the same system. An SAPP objective has been to encourage regional cooperation in energy development and to guide electricity generation and infrastructure through the advancement of non-binding master plans (like the RIDMP).[149] However, it also wanted to ensure that countries remain free to craft their own nation specific energy plans without any obligation to implement the RIDMP.[150] This, in addition to lacking political will, creates a stumbling block to successful implementation and has resulted in a rather two-faced regional energy approach as the SADC

[144] Maupin (note 123 above) 8.
[145] Hadebe et al. (note 30 above) 225-7.
[146] Ibid.
[147] Scholtz (note 52 above) 19.
[148] L.P Sekantsi & S Timuno 'Electricity Consumption in Botswana: The Role of Financial Development, Industrialisation and Urbanisation' (2017) 10 *Review of Economic and Business Studies* 75.
[149] Schreiner & Baleta (note 35 above) 96-9.
[150] Ibid.

stressed regional integration in policy and yet has created an energy structure so fragile it cannot be implemented. The policy framework speaks of regional energy integration in name alone.

The RIDMP does raise the valid argument that the lack of implementation has been exacerbated by several other factors. Namely that SADC has struggled to prepare projects that attract investment. Case in point being WESTCOR's pulling out of Inga III when it encountered delays and could not contribute towards alleviating these.[151] There has been a struggle to obtain funding for all stages of a projects life, a fact worsened by weak energy policy structures in member states that turn investors away. These factors added to the SAPP's unimplementability, exacerbate project delays as none can move forward unfunded.[152] However true these concerns, there are still regulatory issues the SAPP should address at regional level that it has failed to, this only adding to the region's integration charade.

Currently emerging in electricity development is the realisation that solar (to a lesser extent wind) is a viable regional renewable energy option. This report makes the case that the SADC's overlooking of solar might in fact be in contravention of its own Energy Protocol and framework. The immense potential of solar and wind are discussed in the RIDMP itself before it went on to state that solar in particular had been so expensive it discouraged regional investors.[153] This stance speaks to the above criticism that the SADC fails to create instruments that consider current concerns and trends in electricity generation for a region analysist have outlined as most vulnerable to droughts. All of this to say that this stance is globally accepted as incorrect.

In fact, it is estimated that by 2050 solar will dominate the continents renewable energy mix because of falling renewable energy costs, with the most notable fall evident in the cost of solar PV energy (SPV).[154] SPV costs decreased by 77% in the period between 2010 to 2018, followed by price improvements in both on and offshore wind. In fact, so great has been the fall in SPV expenses ,especially in comparison to a slight rise in Hydro between 2010 and

[151] The SADC Infrastructure Plan (note 38 above) 2.1.1., 2.1.4.
[152] Ibid.
[153] Ibid.
[154] https://www.brookings.edu/blog/africa-in-focus/2021/05/05/figures-of-the-week-africas-renewable-energy-potential/

2018- that by 2018 they were now only separated in price by a 0.04 US kilowatt/hour.[155] Solar has become a competitive renewable option, and so the SAPP's use of all policy to show support for only hydro when solar is not only viable but abundantly spread regionally is concerning.[156] By 2018, SPV was generating the cheapest kilowatt/hour (based on a levelized cost of energy) beating out baseload coal by 40% in South Africa. Though affordability of solar is relatively new to the region- this paper argues that it should be enough to push the SAPP into newer more informed plans for the region's energy mix.[157]

That SPV is becoming more affordable every year must be contrasted against the fact that hydro will be become limited by droughts and water scarcity over the next 17 years. SPV has been viewed as most likely to thrive in these circumstances in addition to the fact that Southern Africa generally has low seasonal variations. This would greatly limit the number of times in a year that solar generation is hindered by minimum sun exposure.[158] However, with hydro likely to be unable to supply the level of electricity needed over time, the minimum sun exposure concerns of solar point to this reports main concern with the SADC's energy framework thus far. That there is a need for a true energy mix.[159]There must be other capacity available, especially where energy is shared regionally, that can meet demand during 'dark' moments.[160] Thereby ensuring an efficient green energy mix.

The Energy Protocol speaks to the need for an energy mix. This is supported by two main objectives that speak to the need for cooperation in power pooling in order to ensure secure, reliable and affordable electricity and that regional cooperation should strive to maintain this balance.[161] These objectives for cooperation speak to the attainment of energy security through regional integration (and has been established earlier: energy security is a combination of availability, affordability and efficiency).[162] The availability component heavily depends on the diversification of energy sources, infrastructure and services- which can only be achieved

[155] Ibid.
[156] T Bischof-Niemz & T Creamer *South Africa's Energy Transition: A Roadmap to a Decarbonised, Low-Cost and Job Rich Future* 1 ed (2018) 11-27.
[157] Ibid.
[158] Ibid.
[159] Ibid.
[160] Spalding-Fecher et al. (note 101 above) 90.
[161] The Energy Protocol (note 64 above) Art 3(2) & (4).
[162] Green et al. (note 18 above) 141.

through obtaining an uninterrupted supply of energy.[163] Countries like the DRC with hydro which predominantly depend on one source of energy, have easily disrupted electricity flows.[164] SADC has shown a similar lack of diversification in their energy policies as all focus on large scale Hydro projects. This is detrimental to its aim of eradicating the crisis.

Furthermore, the SAPP undertakes to ensure sustainable electricity development through eco-environmentally sound practices. However, in light of the aforementioned hydro and climate concerns - the support of four only hydro projects is not economically sound.[165] Especially in addition to the Inga III's massive obstacles. Learning from these and implementing new solar information into policies would represent a greater meeting of these SAPP objectives. Given the SAPP's 2050 goal, it is not far-fetched to imagine that the approach to achieving this must consist of building a robust and mixed RE mix. Solar is extremely competitive and would thrive under climate change impacts, wind and geothermal are also valid options in addition to hydro and natural gas.

The region is not strapped for renewable energy options to add to the mix, it does appear- however- strapped for implementation powers and a meeting of the minds between members. However, policy fixing is not enough if implementation is still a problem and as of 2022, it is. Despite power outages in the region highlighting that the aforementioned protocol objectives have not been met since 1998- nationalism continues to trounce integration and the massive role it should play in the sharing of a wide range of resources from different parts of the region.[166] SADC needs an integrated energy approach to combat an energy crisis that threatens to halt socio-eco growth and environmental health, yet time continues to be wasted.[167]

[163] Ibid.
[164] Ibid.
[165] Updated Regional Power Status in Africa Power Pools Report (infrastructure Consortium for Africa, November 2016).
[166] Chanakira (note 17 above) 75-7.
[167] Scholtz & Pallangyo (note 63 above) 21.

4.2 A Way Forward

A lesson from Inga III is that mega-dam financing might be on the decline and economically, for a region struggling with renewable financing, further investment should be lessened. Similarly, to Inga III, the World Bank pulled out of the Indian Narmada dam project in 1993 after years of support because of delays and environmental concerns. This lesson is furthered by the fact that such projects generally encounter delays that drive up overhead costs, a factor that lost Inga many investors.[168] Risks associated with dams, bad project planning regionally and international bodies like the World Commission of Dams noting them as 'cost-ineffective' are putting investors off.[169] As for what this means for current hydro-projects, Shakespeare's 'Macbeth' comes to mind particularly the phrase '…returning were as tedious as go o'er…'. To continue them would produce the same results as to cease. Delays, money lost and climate-hindered capacity are essentially set in stone.

This report has outlined several major issues, namely that; SADC is failing in protocol to create up-to-date instruments that are influenced by current findings and not only lay out 'plans of plans' and uninformed-limited projects. Another issue is the diversification of energy security and how this has been undercut by a predominant focus on hydro. As well as the side-stepping of SPV. In addition is the matter of the presence of many non-binding policy documents and strategies, none being capable of providing direction regarding energy and all indicative of a lack of energy policy development. Furthermore, before the region can address its infrastructure failures, difficulties attracting energy investment etc., it must first address its two-faced approach to regional integration and decide whether it in fact wants to commit. Political consensus among members is needed in this regard as true deep integration would see some nationalistic, short-term, costs but great regional wins.[170]

The lesson to be taken from SADCC should have been that true integration needs structure and governance that goes beyond individual members and vests in regional institutions. Ones independent of member influence but voted in by members with the intention to balance both regional and national interests.[171] The SADC's current decentralisation approach is not

[168] Warner (note 119 above) 9.
[169] Ibid.
[170] A Saurombe 'The Role of SADC Institutions in Implementing SADC Treaty Provisions Dealing with Regional Integration' (2012) 15 *PELJ* 454, 454-8.
[171] Ibid.

working, speaking of integration in policy but not in action accomplishes nothing. If this approach were abandoned, SADC would be able to approach the regions urgent crisis with a firmer hand. Hopefully starting with a more informed push for not just any renewable energy but a plan outlining climate impacts on this choice. At the core of the major issues outlined in this report is the fact that the region risks sinking deeper into the climate injustices it already faces by being left behind as the rest of the world embraces renewable energy solutions with longevity. The region cannot afford to be predominantly dependent on Hydro, biomass or other climate and degradation dependant option and policy must reflect this.[172] Room for solar and geothermal must be made.

[172] Spalding-Fecher et al. (note 101 above).

5. In Conclusion.

This report set out to interrogate the regions energy crisis and its real-world renewable energy feasibility against the backdrop of this regions pressing growing socio-economic demands, and how renewable energy could meet these as well as attain regional energy security. It found that were renewable energy implementation has occurred the lack of deeper integration has seen progress happen so slowly that it is overlapped by current socio-economic developments. There is need for haste in SADC's institutional approach and integration matters because the energy crisis and its impacts on socio-economic and environmental challenges will become more far-reaching. This report finds that there is a great need for the SAPP to consolidate its energy policy framework and update the Energy protocol. Approaches to energy must be intermingled with an understanding of the impact climate change will have on the region specifically.

This would aid the body with implementing updated and informed electricity generation plans and thereby ensuring that all three pillars of the sustainable development principle are met and energy security attained. An understanding of the need for diversification of the regions approach to the renewable energy mix would be best implemented by a deep integration approach. If solar -on and off- grids were provided with the same policy backing as the four hydro projects, in addition to actual implementation, this would change the face of renewable energy generation in the SADC and make a massive contribution to energy security. Lack of implementation power in addition to a hollow call for regional integration highlights the SADC's game of pretend. The crisis and climate change, however, speak to the pressing reality faced by the region.

A stricter framework through which SADC can operate is needed in order to correct the deeply rooted lack of implementation. This paper has highlighted the implementation and outdated problems faced by the SADC as well as the renewable energy options available. The lack of harmonisation regarding electricity generation among members will play a great role in worsening the current crisis if not addressed and this paper argues that among other options, solar would be the way of addressing this. The role solar can play in the alleviation of this crisis in the long term is a factor that requires acknowledgement and policy-backing.

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